POPULATION, MOULT, BIOMETRICS AND SUBSPECIES OF LARGE SAND PLOVER *CHARADRIUS LESCHENAULTII* WINTERING IN SOUTHEAST INDIA[1]

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(*With two text-figures*)

Key words: *Charadrius leschenaultii crassirostris, Charadrius leschenaultii leschenaultii,* Australia, adult, first year bird, moult, weight, Gulf of Mannar.

Based on the results of the bird ringing studies conducted between 1985-1988, along with bird count data, this study provides information on the population, moult, proportion of young birds, measurements and subspecies of the large sand plover *Charadrius leschenaultii* wintering in the Gulf of Mannar Marine National Park in southeast India. About 300-500 birds winter and some individuals spend the breeding season (summer) here. The proportion of "first year" birds was < 30%. Adults complete the primary moult by October, one to two months earlier than in northwest Australia. Birds weighed at departure weigh at least 30% less than in Australia. Two subspecies, *crassirostris* and *leschenaultii*, have been recognised from the wintering population.

Introduction

This study presents the results of bird migration studies carried out between 1985-1988 at the Gulf of Mannar (GOM) Marine National Park, an important wader habitat in India. Although the large sand plover *Charadrius leschenaultii* is known to winter all along the seaboard of India, its distribution pattern is not clearly known. However, it is seen in small numbers on the entire seacoast of India (Ali and Ripley 1983). Moreover, bird ringing carried out at different sites along the east coast from Orissa (Chilka Lake) to south Tamil Nadu indicates that it is seen in several hundreds only in GOM, which has extensive intertidal sandflats, the most favoured habitat of this species.

An eastern species, the large sand plover occurs in greater numbers towards east Asia, and in Australia where it is one of the four abundant wintering species (Barter and Barter 1986). This paper deals with the population fluctuation, proportion of young birds, moult and measurements, and subspecies recognition, based on the bird count and ringing data for 160 individuals ringed in three migratory seasons between 1985-1988. The weight and moult score recorded during this study is compared with the observation made at northwestern Australia by Barter and Barter (1986).

Study Area

Two corals islands, namely Manali and Hare Island and Pillaimadam lagoon in the GOM near Mandapam, and the Dhanushkodi lagoon in Rameswaram Island were the major study areas selected for this study. For more details see Balachandran (1995).

Methods

The birds were caught with mesh nets and nooses, the traditional methods of professional bird trappers of coastal regions. Birds caught were ringed, aged, measured, weighed and examined for moult before being released.

[1]Accepted July, 1997

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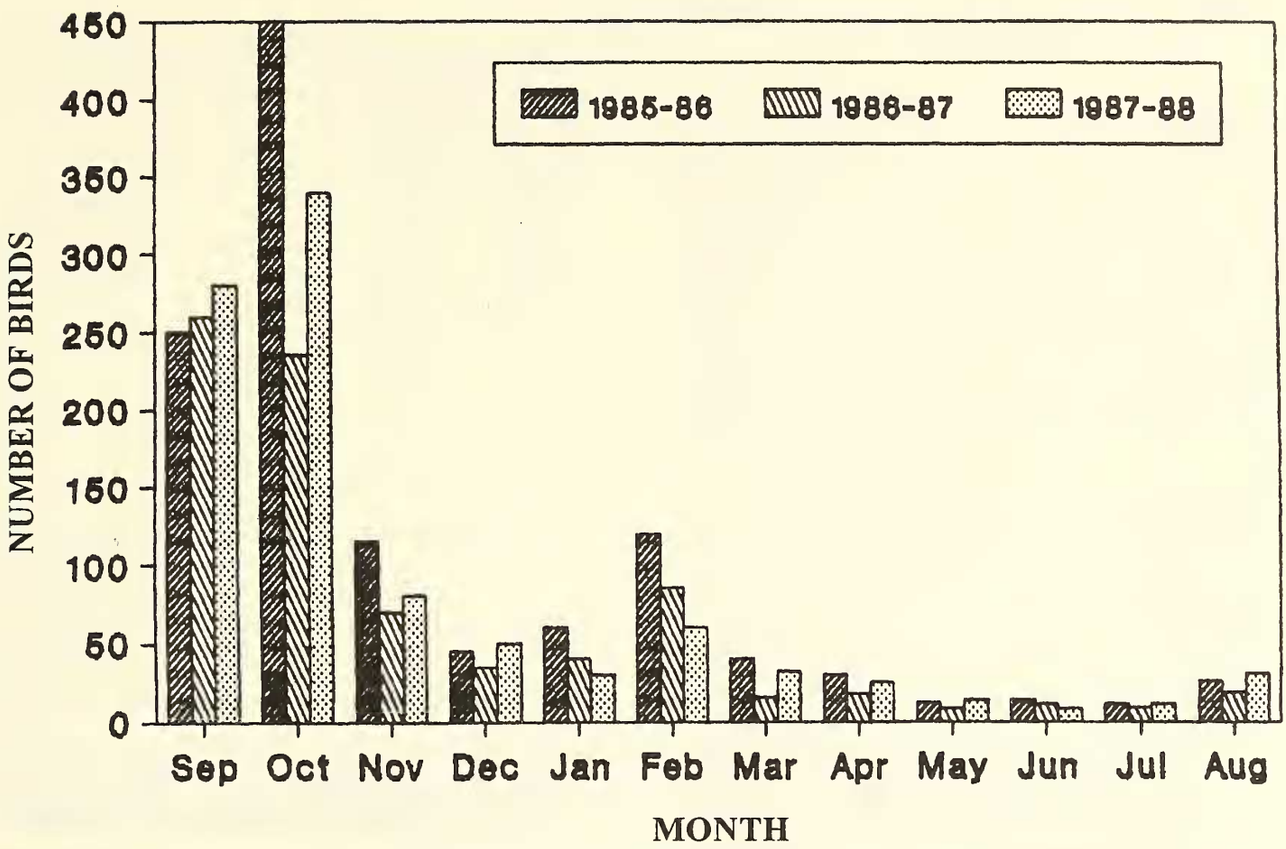

Fig. 1: Population fluctuation of large sand plover *Charadrius leschenaultii*

Birds were age-classified as 'adults' and 'first year' based on the characters described in the BTO Guide No. 17. 'Adult' refers to birds older than first year and includes second year birds from the first of August onwards. The term 'first year' refers to birds hatched in the same year.

Moult scoring was followed as in Snow (1967), wing, bill and tarsus were measured to the nearest millimetre (mm), and the birds weighed to the nearest gram (gm).

Monthly bird counts were carried out to determine the seasonal fluctuation in bird numbers. Though a few migrants started arriving in late August, the netting started from September onwards. Hence, each season commenced from September and ended in August. Thus, 1985-86, 1986-87, 1987-88 seasons are referred to as first, second and third seasons respectively.

Results

Population fluctuation: The large sand plover arrived in low hundreds in September and October. The numbers were maximum in September and early October (300-450) due to the occurrence of transient individuals enroute to the other wintering grounds. They were found in lesser numbers (40-50) afterwards and till December end. A slight increase in their numbers was observed from the second half of January and February, probably due to the reappearance of transient individuals on their return journey to the breeding ground (Fig. 1). The maximum number of individuals counted for the three seasons was 450 in 1985-86. Some individuals, mostly first year birds, were found to spend the summer in Manali and Hare Is.

Age composition: Adults outnumbered first year birds in all the three seasons. The adult proportion was >70%. There is no significant variation in the adult/first year bird ratio for the three seasons. However, a slight decrease in the proportion of first year birds was observed in the second season (1986-87) (Table 1).

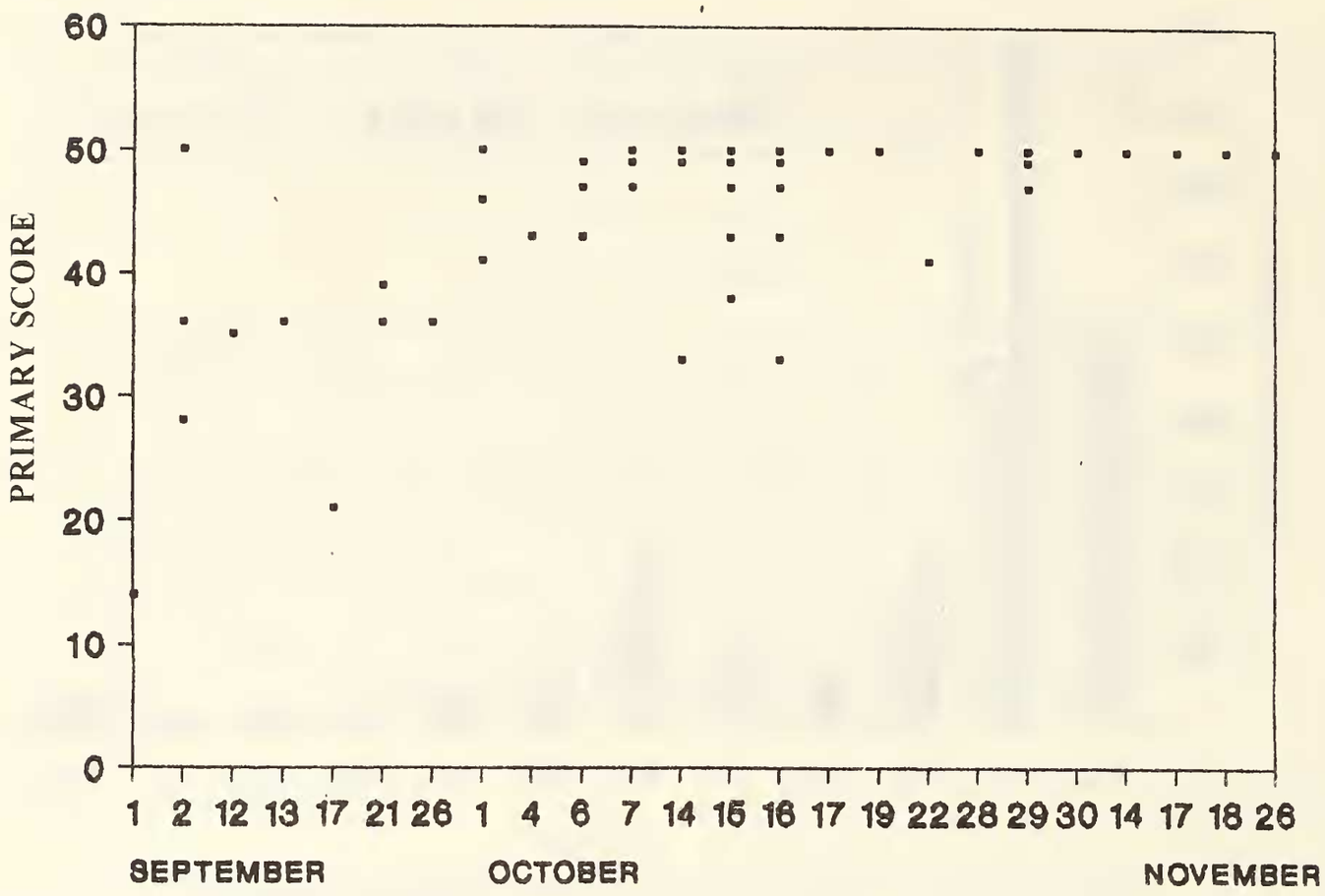

Fig. 2: Moult score vs date in large sand plover

TABLE 1

PROPORTION OF ADULT/FIRST YEAR BIRDS CAUGHT

Year	No.Ringed	No.Adult	No.1st year	% 1st year
1985-86	91	65	26	29
1986-87	30	22	8	26
1987-88	44	31	13	29

Primary moult: The majority of the birds caught in September were in advanced moult or complete moult, which indicates that the moult had already commenced either at breeding sites or on passage. One bird caught with a moult score of 14 in early September was the lowest to be recorded. Most of them completed their moult by late October (Fig.2), which is earlier by one month at least, than observed in northwestern Australia by Barter and Barter (1986) where they complete moulting between November and December. The same authors also estimated the duration of moult as 120 days. A second year bird, ringed as first year bird in the previous season and retrapped on October 1, had completed its moult. Hence, it is evident that birds observed with a moult score between 45-50 during September are second year birds. First year birds commenced their moult during the first week of April.

Site fidelity to wintering ground: Out of the 91 birds ringed in the first season, three birds each were recovered in the two subsequent seasons.

TABLE 2

BIOMETRICS OF LARGE SAND PLOVER CAUGHT AT GULF OF MANNAR

		Range in mm	Mean	S.D.	N
Wing	Adult	134-154	145.7	3.83	91
	1 year	127-152	142.3	5.31	44
Bill	Adult	22-26	24.0	1.06	109
	1 year	22-28	23.4	1.09	44
Tarsus	Adult	35-40	37.6	1.31	108
	1 year	35-40	37.6	1.1	44

TABLE 3
MEASUREMENT RANGE OF LARGE SAND PLOVER FROM OTHER SOURCES (in mm)

	Wing	Bill	Tarsus
C.l. columbinus	132-150	20-24	34-38
C.l. crassirostris	137-153	22-27	36-41
C.l. leschenaultii	136-149	21-25	34-39
	(Cramp and Simmons 1983)		
	132-153	20-28	34-41
	(Hayman *et al.* 1986)		
	134-150	24-27	35-38
	(Ali and Ripley, 1983)		

It is evident that site fidelity to the wintering ground exists in this species as in other waders.

The measurements obtained at GOM fall within the range given by the above mentioned authors, except for the wing length of the two "first year" birds, 5 mm shorter (127, 128 mm) than the minimum range given by all authors.

Weight changes: The weight varies from 59-95 gm. A maximum weight of 95 gm was recorded in March. However, the monthly average weight did not fluctuate much, being 73-79 gm. The maximum average weight was observed in January.

Subspecies: *C. leschenaultii columbinus* (Turkey and Jordan east to Caspian) is the shortest in bill length.

C. leschenaultii crassirostris (Caspian east to above Lake Balkash) is the largest in wing, bill and tarsus length.

C. leschenaultii leschenaultii (Mongolia, W. China and adjacent USSR) intermediate in bill length (Hayman *et al.*, 1986).

The bill length ranges from 22-28 mm for the birds caught at GOM. The absence of birds with shortest bill (20 and 21 mm) and a few birds with 22 mm bill length indicate that the species wintering at GOM does not belong to the race *columbinus*. However, the presence of birds with 23 mm and 24 mm bill length (intermediate bill length) and 25-26 mm (highest bill length) shows that the population probably includes both the races *leschenaultii* and *crassirostris*.

DISCUSSION

Individuals with maximum wing, bill and tarsus lengths indicate the occurrence of *C.l. crassirostris*. However, the average adult wing length (145.7 mm) and bill length (24 mm) obtained in the present study are much nearer to those observed by Barter and Barter (1986) in northwest Australia (143.8 and 23.8 mm respectively),which also confirms the presence of *C.l. leschenaultii.*

The moult duration (120 days) calculated, based on the feather growth rate from individuals retrapped in the same season by Balachandran (1990), is consistent with the duration estimated by Barter and Barter (1986) for the large sand plover in Australia. The completion of moult in second year birds observed at GOM was much earlier than other adults, which is also consistent with the findings of Cramp and Simmons (1986) on the primary moult of second year birds. The primary moult commenced elsewhere (probably on the breeding sites) and was completed without any suspension at GOM by the end of October. This period is one to two months earlier than in Australia, where these birds arrive with suspended moult. Due to suspended moult, the Australian wintering population completes the primary moult one to two months later than south Indian wintering birds. As GOM is much closer to the breeding ground than is Australia, the wintering population of India has to travel less distance than the wintering population of Australia. Hence, there is probably no need for the Indian population to suspend the moult.

Similarly, wintering birds in Australia gain more weight (120 gm in April) than in India (maximum 95 gm), to undertake the long return journey, as their wintering grounds are further away from the breeding grounds than are Indian wintering grounds. However, the average weight 73-79 gm observed during the non-migratory period in GOM is consistent with that observed in northwest Australia (73-76 gm) by Barter and Barter (1986).

Large sand plover wintering in GOM are faithful to the wintering sites, a habit that was also confirmed in the Australian wintering grounds.

Acknowledgements

This study was carried out as a part of the Bombay Natural History Society (BNHS) Bird Migration Study supported by U.S. Fish and Wildlife Service under a grant from PL-480 funds No. 14-16-0009-87-02 released through Department of Environment, Wildlife and Forests,Govt. of India. I gratefully acknowledge permission to work in the area from the Tamil Nadu Forest Department, and the regional centre of Central Marine Fisheries Research Institute, Mandapam camp for facilities. I thank Mr. J.C. Daniel, the then Director of BNHS, for guidance and for going through this manuscript.

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